

## TKC C-710 Nozzle Failure at 2-inch Feed Line



**IMPACT ID: #11973**

**Location: Hydro Division,  
North Isomax, TKC Unit**

**Contact Information:**

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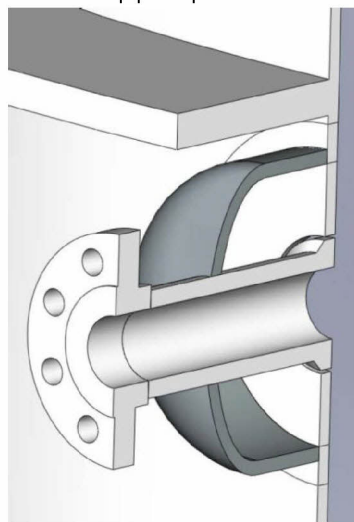
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**2" feed nozzle from V-470  
(light oils at 100 F)**



Depiction of Nozzle failure, and  
welded 8" pipe cap leak-seal



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Right Way, Every Time**

### Incident Description:

At 12:40pm, on 4/13/11, Operations shut down the TKC unit after observing a leak and fire at the Fractionator C-710. Chevron Fire Dept (CFD) responded immediately to extinguish it. By 1pm, all feed streams were completely out of the TKC and the C-710 was de-pressured. Agency notifications were made and no permit violations occurred. By 8pm, maintenance crews had access to the column, flanges, and nozzles in the vicinity of the fire to assess damage and make temporary repairs: (i) A pinhole leak occurred at a 2-inch nozzle, which had been replaced in 2009, and has been temporarily repaired with an 8" piping end cap expected to last until 2014; (ii) A 1" nozzle that was also replaced in 2009 was reinforced since it was installed in a similar manner to the failed nozzle; and (iii) Another 2" lined nozzle where a 1/8" diameter weep hole had been leaking was seal welded prior to startup. On 4/17/11, C-710 was returned to operation and both TKC modules were at normal feed rates by 4/18/11. COI was reported as \$1.2 MM.

### Investigation Findings:

The exact cause will not be confirmed until 2014 but we believe the following two items most likely caused this failure: 1) A nearby piping support was not reinstalled in 2009, thereby potentially subjecting the nozzle to excessive mechanical fatigue; and 2) possible chloride stress corrosion cracking of the weld, nozzle overlay, or vessel cladding.

### Lessons Learned / Business Practices:

- 1) Timely correction of visible line vibration and inactive piping supports should reduce mechanical fatigue at nozzle connections.
- 2) Always follow weld procedures and inspection hold point instructions.

### What Worked Well:

- 1) Prompt Operations and CFD responses avoided further risk to personnel and other potential damage.
- 2) Maintenance, Inspection, & Engineering support was excellent and the restart of the TKC plant was well done.

### Recommendations:

- 1) Verify that the proper reinstallation of the pipe supports occurs each time they are temporarily removed for maintenance access.
- 2) Inspect the column in the vicinity of the nozzle crack during the 2014 shutdown and perform a failure analysis with ETC to make any appropriate repairs prior to startup.

### Tenets of Operations Violated:

- # 10. Always involve the right people in decisions that affect people and equipment.
- # 8. Always address abnormal conditions.

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